MAIN STREET BRIDGE
(Bridge No. 122/098)
Main Street (New Hampshire State Route 12 and 103)
spanning the Sugar River, 3.8 miles east
of Vermont State line
Claremont
Sullivan County
New Hampshire

HAER No. NH-23

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

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HISTORIC AMERICAN ENGINEERING RECORD

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LOCATION: Main Street (New Hampshire State Route 12 and 103), spanning the Sugar River, 3.8 miles east of Vermont state line, Claremont, Sullivan County, New Hampshire.

USGS Mt. Ascutney, New Hampshire Quadrangle, Universal Transverse Mercator Coordinates: 18.714990.4805710

ENGINEER/BUILDER: Storrs and Storrs Bridge Engineers, Concord, New Hampshire/Boston Bridge Works, Inc., Boston, Massachusetts.

DATE OF CONSTRUCTION: 1915

PRESENT OWNER: New Hampshire Department of Transportation (NHDOT)

PRESENT USE: Vehicular bridge

SIGNIFICANCE: The Main Street Bridge is a representative example of a riveted steel Warren deck truss highway bridge, typical of early twentieth-century bridge technology. The bridge lies at the heart of Claremont's Lower Village National Register Historic District. Two preceding iron bridges have spanned this historically important Sugar River crossing.

PROJECT INFORMATION: The Main Street Bridge was recorded in October 1995 by the Cultural Resource Group of Louis Berger & Associates, Inc., East Orange, New Jersey, for NHDOT. The recordation was undertaken pursuant to a Memorandum of Agreement between the Federal Highway Administration and the New Hampshire State Historic Preservation Officer, executed in association with the planned replacement of the Main Street Bridge, Claremont, New Hampshire. Project personnel included Richard M. Casella, Senior Architectural Historian, and Rob Tucher, Photographer.

DESCRIPTION

The Main Street Bridge (Bridge No. 122/098) consists of a single-deck truss span resting on concrete and stone abutments. The bridge carries New Hampshire combined State Routes 12 and 103 in an east-west direction over the Sugar River. The bridge is located approximately 30 feet east of the intersection of Main and Elm streets, approximately 40 feet west of the intersection of Main and Union streets, and approximately 3.8 miles east of the Vermont state line.

The overall dimensions of the bridge are 108 feet, 5 inches long, 28 feet wide, and 18 feet deep, including the height of the railings. The truss measures 98 feet, 5 inches in length between bearing centers, 19 feet, 6 inches in width, and 11 feet in depth. It spans the river at a height of about 14 feet. The truss is of the Warren type, characterized by parallel chords and diagonal members which function in both tension and compression. All structural members of the truss are steel with riveted connections.

The bottom chords, diagonals, and verticals are riveted members consisting of four angles starred with unequal legs. Top chords consist of double 12-inch channels connected with 20-inch cover plates of both 3/8-inch and 1/2-inch thickness, and double 2-1/4x3/8-inch lacing bars. Floor beams are 24-inch plate girders. The 10-inch I-beam stringers rest on angle seats so that the top flange is flush with the top of the girder to carry the 5-inch reinforced concrete deck. Intermediate bracing is placed at each vertical and consists of two 3-1/2-inch angles. The roadway is 20 feet wide with integral curbs. A 5-foot, 6-inch-wide concrete sidewalk is cantilevered off the south side of the bridge, carried by the extended floor beams.

Both ends of the bridge rest on beveled wing concrete abutments cast against the rubble stone retaining walls which edge the river. The roadway railing on the north side of the bridge consists of three rows of two-inch pipe supported by four-inch angles and square cast-iron newel posts at each end. The sidewalk railing is of the balustrade type, made up of 7/8-inch round-bar balusters spaced six inches apart, capped with a three-inch pipe handrail. The railing is supported by posts consisting of two channels rived back to back. Square, cast-iron newel posts with embossed panels and ball finials decorate each end of the railing.

HISTORICAL INFORMATION

Background

Main Street Bridge is located on the west side of Claremont in the neighborhood known as Lower Village. This section of Claremont was largely the product of two major phases of industrial development, the first beginning in 1832, the second initiated some 50 years later.

The first phase began with the formation of the Claremont Manufacturing Company for the express purpose of harnessing the waterpower potential of the Sugar River. The founders of the Claremont Manufacturing Company "engaged in widespread real estate speculation and development, laying out Central, Main, and River streets," and building a stone factory for the production of satinet and paper, "with associated houses and stores" (Candee 1977). By the 1850s, enterprises in the Lower Village included the Sugar River Gristmill, located at the east end of the Main Street Bridge, several facilities of the Claremont Manufacturing Company located upriver around River, Pearl, and Main streets, and, further downriver, a cutlery, a woolen mill, a foundry, and Simeon Ide's printing plant (Walling 1851, 1860).

Beginning in the 1880s, the second phase of industrial development within the Lower Village resulted in the replacement of existing manufactories and the expansion of others to meet new production requirements. Waterpower sites below Main Street came to be dominated by the Sugar River Paper Company and the Bailey hosiery mill, while the firm of Freeman and O'Neil developed extensive woodworking facilities just west of the Main Street Bridge. Further upriver, the Maynard & Washburn Shoe Manufactory redeveloped many of the former Claremont Manufacturing Company sites. Between 1888 and 1919, the Sullivan Machinery Company, which had initiated production along the Sugar River in 1868, significantly expanded its operations, with massive facilities on both sides of the river. With each corporate expansion, the need for housing, commercial services, and transportation improvements correspondingly increased. At the turn of the century, the Lower Village was dotted with tenements, either newly built or grafted onto smaller residential properties remaining from earlier periods in the village's industrial history (Candee 1977; Heritage Conservation and Recreation Service [HCRS] 1978; Hurd 1892).

History of Main Street Bridge

The details of the first bridge constructed at the present Main Street Bridge location were not determined. It is likely that a wood bridge, or a roadway atop a wood dam, was erected during the early 1840s in conjunction with the construction of the adjacent Sugar River Mills. An early photograph, circa 1865, shows an iron suspension bridge spanning the river in the same location as the present bridge (HCRS 1978:2). By 1895, the suspension bridge was replaced by an iron pony bowstring arch bridge, also visible in a photograph (Waite 1895:357).

In 1914, critical structural members of the bowstring arch bridge were found to be in a severely deteriorated condition, and the Town of Claremont immediately began planning for its replacement. In early 1915, Claremont hired the engineering firm of Storrs and Storrs, of Concord, New Hampshire, to design a new Main Street Bridge as well as a new Broad Street Bridge. Bids were received on May 25, 1915, and the contract was awarded to the lowest bidder, Boston Bridge Works, Inc., of Boston, Massachusetts. The contract amount was $7,990,

which Claremont considered "exceedingly low" due to the fact that they had "gotten to the market early in the season . . . enabling the work to be completed before cold weather interfered" (Town of Claremont 1916:11). In addition to the amount paid to Boston Bridge Works, Inc., Claremont paid an additional $1,443.47 for a variety of work associated with the construction of the bridge, raising the total cost to $9,430.62. Included in the additional work were $399.50 for engineering services, $440.33 for concreting the approaches, and $342.80 for watchman services. A detailed accounting of the expenditures is provided in Claremont's annual report (Town of Claremont 1916:12, 52, 53).

Boston Bridge Works, Inc., was started in 1877 by D.H. Andrews, who had operated a bridge building firm under his own name for several years prior in the Cambridge section of Boston. The factory was located at 70 Kilby Street, but later moved to 13 Pemberton Square. Under the chief engineer, J.R. Worcester, the firm designed and built bridges throughout New England and the Midwest (Darnell 1984:22, 23, 76).

The Warren truss was designed in England by James Warren and Theobald Monzani in 1848. Their intention was to create the simplest possible truss, composed of members of equal length and dimension, allowing economy in its manufacture and assembly. In its pure form, the Warren truss is composed of a series of connected equilateral triangles, with the diagonals functioning alternately in compression or tension. All loads on the truss produce a compressive stress in the top chord, a tensile stress in the bottom chord, and stresses equal in magnitude, but opposite in sign, in adjoining web members (diagonals). Although not a specific claim of the inventors, the design allowed for the easy calculation of the stresses involved and would become the standard textbook example on the subject. The practical characteristics of the truss and its attractive simplicity have made it the most widely used and modified truss form (Condit 1960:117, 118; DuBois 1900:54; Ketchum 1905:65, 66).

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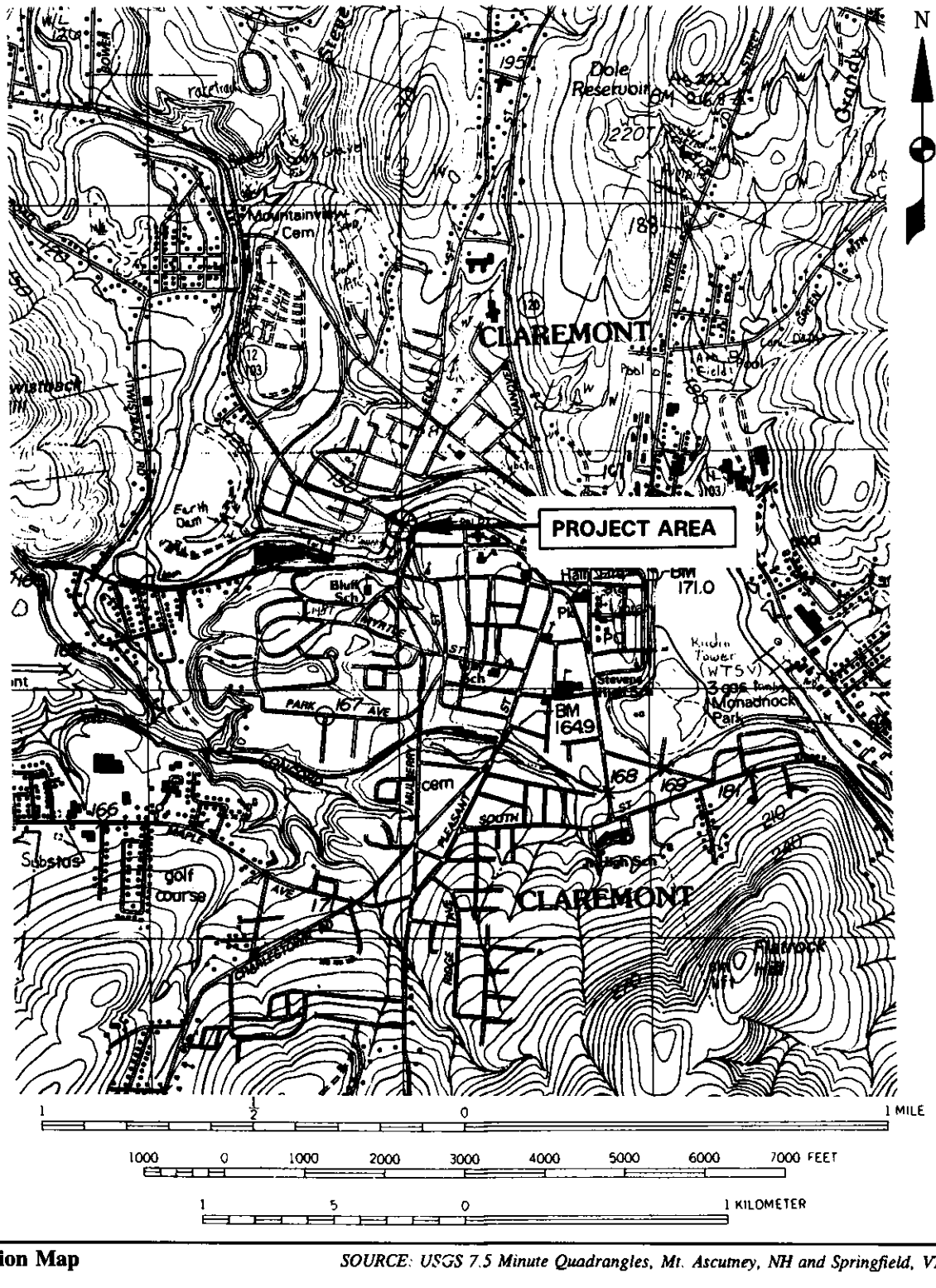
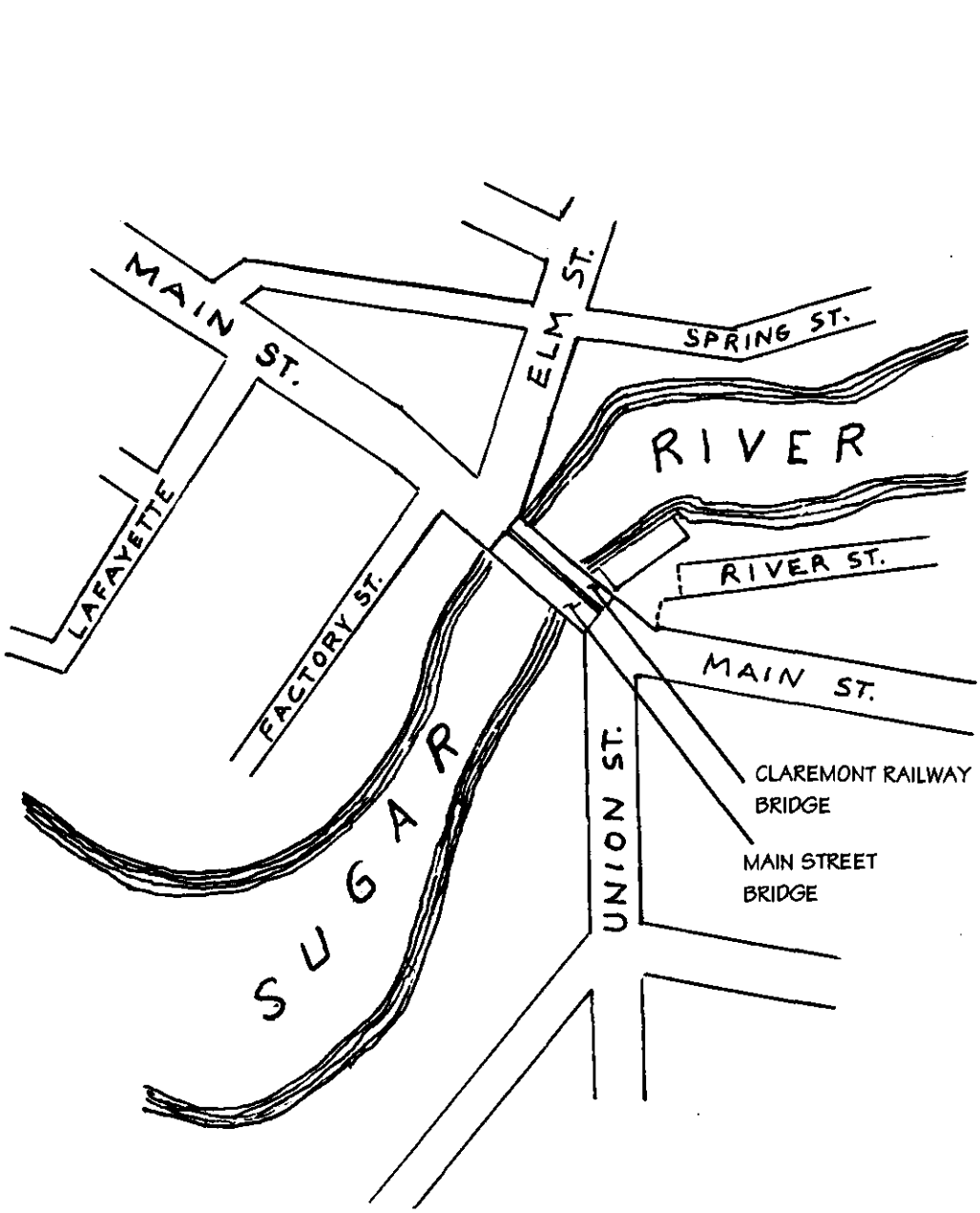


Location Map

SOURCE: USGS 7.5 Minute Quadrangles, Mt. Ascutney, NH and Springfield, VT



Main Street Bridge, Site Sketch